

## CLAIMS

Having thus described our invention, what is claim as new and desire by Letters Patent is as follows:

- 1    1.    A single pass sequencing system, comprising:
  - 2            a transport system which transports articles;
  - 3            at least one staging area which stages the articles to be injected onto the transport
  - 4    system;
  - 5            a buffer which stores the articles received from the transport system;
  - 6            a loader which loads the articles from the buffer onto the transport system at a
  - 7    location downstream from the at least one staging area; and
  - 8            a controller in communication with the at least one staging area, the buffer and the
  - 9    loader, the controller coordinating the loader and the at least one staging area to inject the
  - 10   articles onto the transport system in a delivery point sequence.
- 1    2.    The system of claim 1, further comprising:
  - 2            at least one feeder which feeds the articles in random order onto a feed track, the
  - 3    feed track being in flow communication between the at least one feeder and the at least
  - 4    one staging area and feeding the articles from the at least one feeder to each of the at least
  - 5    one staging area.
- 1    3.    The system of claim 1, wherein the controller forces the articles having a lowest

2 delivery point address to a staging area of the at least one staging area nearest the at least  
3 one feeder.

1 4. The system of claim 1, wherein:

2 the buffer includes a belt or actuated rollers for storing and transporting the  
3 articles from the transport system to the loader;

4 the buffer includes a first end and a second end, the articles entering the buffer at  
5 the first end and being transported to the second end;

6 the loader is positioned at the second end to load the articles onto the transport at  
7 a location remote from the articles entering the buffer; and

8 the transport system is a plurality of pinch belts.

1 5. The system of claim 4, wherein the buffer stores and transports the articles in a  
2 shingled manner.

1 6. The system of claim 1, further comprising a scanning device for reading destination  
2 information on the articles and providing such information to the controller.

1 7. The system of claim 6, wherein the scanning device is an optical recognition system or  
2 a bar code scanner.

1 8. The system of claim 1, wherein the controller:

2 assigns a virtual code to the articles for sorting and sequencing the articles;

3           monitors the position of the articles within the buffer, on the transport system and  
4   within each of the at least one staging area; and  
5           instructs the loader and one staging area of the at least one staging area to load the  
6   articles onto the transport system, in a sequence, based on the virtual code and a timing of  
7   the articles as they pass by the one of the staging areas.

1   9. The system of claim 8, wherein the controller:

2           instructs the loader to create a gap between the articles when loading the articles  
3   onto the transport system; and  
4           instructs the one staging area to inject another article into the gap which is in a  
5   sequence with the articles loaded from the loader.

1   10. The system of claim 1, wherein the controller monitors the location of the articles on  
2   the transport, the buffer and the at least one staging area.

1   11. The system of claim 1, further comprising a plurality of sensors associated with the  
2   transport system to monitor the location of the articles thereon.

1   12. The system of claim 1, wherein the articles are mail pieces.

1   13. The system of claim 1, wherein the transport system is a loop.

1   14. A single pass sequencing system, comprising:

2 at least one feeder in communication with an outer transport, the at least one  
3 feeder randomly placing mail pieces onto the outer transport;  
4 an inner transport;  
5 a plurality of staging areas which receive the mail pieces from the outer transport  
6 and stages the mail pieces to be injected onto the inner transport;  
7 a buffer which stores the mail pieces received from the inner transport;  
8 a loader which loads the articles from the buffer onto the inner transport at a  
9 location downstream from the plurality of staging areas;  
10 a scanning device which reads delivery information associated with the mail  
11 pieces; and  
12 a controller in communication with the scanning device and storing the delivery  
13 information, and providing control to the plurality of staging areas, the buffer and the  
14 loader based on the delivery information, the controller coordinating the injection of the  
15 mail pieces onto the inner transport from the loader and the plurality of staging areas in a  
16 delivery point sequence.

1 15. The system of claim 14, wherein the controller further:

2 forces the articles having a lowest delivery point address to an open staging area  
3 furthest from the at least one feeders;  
4 assigns a virtual code to the mail pieces for sorting and sequencing the mail  
5 pieces;  
6 monitors the position of the mail pieces within the buffer, on the inner transport  
7 and within the plurality of staging areas;

8           instructs the loader to create a gap between predetermined mail pieces when  
9   loading the mail pieces onto the inner transport; and  
10           instructs at least one determined staging area of the plurality of staging areas to  
11   inject another mail piece into the gap which is in a sequence with the predetermined mail  
12   pieces.

1   16. The system of claim 1, wherein:

2           the buffer includes a belt or actuated rollers for storing and transporting the mail  
3   pieces in a shingled manner received from the inner transport; and  
4           the loader is positioned to load the mail pieces onto the inner transport at a  
5   location remote from the articles entering the buffer.

1   17. A method of sequencing mail pieces, comprising the steps of:

2           determining information of mail pieces associated with delivery destinations;  
3           injecting a first set of mail pieces into a mail stream;  
4           storing the first set of mail pieces in a buffer received from the mail stream;  
5           staging other mail pieces downstream from the buffer;  
6           injecting a determined amount of mail pieces, in a sequence, from the first set of  
7   mail pieces into the mail stream based on the information;  
8           injecting another of mail pieces, in sequence, from the staging into the mail  
9   stream created by the injecting step and based on the information.

1   18. The method of claim 17, further comprising creating a gap between the determined

2 amount of mail pieces prior to injecting the another of the mail pieces into the mail  
3 stream.

1 19. The method of claim 18, wherein the another mail pieces is injected into the stream  
2 at the gap such that the another mail pieces and the determined amount of mail pieces are  
3 in sequence of delivery destination.

1 20. The method of claim 17, further comprising:  
2 monitoring the position of the mail pieces during the storing step and in the mail  
3 stream;  
4 creating a gap between the set of mail pieces when loading into the mail stream;  
5 and  
6 injecting the another mail pieces into the gap which is in a sequence with the set  
7 of mail pieces.